

DYNAMIC PRICING IN AN UNBALANCED MARKET

TECHNICAL FIELD OF THE INVENTION

This invention relates generally to electronic commerce and more particularly to dynamic pricing in an unbalanced market.

BACKGROUND OF THE INVENTION

Business transactions are increasingly taking place over the Internet and other electronic communication networks. Electronic markets may provide a forum for such transactions, allowing buyers to locate sellers, and vice versa. This process may involve a buyer (or seller) identifying a seller (or buyer) offering to sell (or buy) a suitable quantity of a particular item at a suitable price. Typically, the buyer wants to buy at the lowest possible price, and the seller wants to sell at the highest possible price. Market prices (meaning prices at which transactions between buyers and sellers actually take place) may be determined by the relative buying and selling pressures in the market. These pressures may be in constant flux, causing market prices to change over time.

In a fair market, no particular buyer or seller (or relatively small group of buyers or sellers) may control market prices. As a result, market prices may better reflect actual buying and selling pressure in a fair market. While a fair market may be an ideal market for business transactions, few actual markets are in fact fair markets. In an electronic market, for example, one side of the market may include fewer market participants than the other side of the market, and those market participants may each have a capacity to buy or sell that is substantially greater than the capacity of the individual market participants on the other side of the market to sell or buy. Such a market may be referred to as an "unbalanced" market. In such a market, the larger-capacity market participants on the less populous side of the market may have disproportionate control over market prices (due to their buying or selling power relative to the other market participants), resulting in a market that is not substantially fair.

SUMMARY OF THE INVENTION

According to the present invention, disadvantages and problems associated with previous electronic markets may be substantially reduced or eliminated.

In one embodiment of the present invention, an electronic marketplace includes one or more computers collectively supporting a market having two sides and in which there are generally substantially fewer market participants associated with the first side than with the second side. Each market participant associated with the first side generally has a substantially greater market capacity than each market participant associated with the second side. The first side is substantially sealed such that offers associated with the first side are substantially inaccessible to substantially all of the market participants, and the second side is substantially open such that offers associated with the second side are substantially accessible to substantially all of the market participants. The one or more computers collectively receive offers from market participants associated with the first side and from market participants associated with the second side. Each offer includes at least an offered price and an offered quantity. The one or more computers prioritize among any offers associated with the first side that include substantially equal offered prices and among any offers associated with the second side that include substantially equal offered prices according to a predetermined prioritization scheme. The prioritization among such substantially equally priced offers determines the order in which they are matched with other offers. The one or more computers also match a first offer associated with the first side with a second offer associated with the second side according to a relationship between a first offered price associated with the first offer and a second offered price associated with the second offer and determine a strike price for the match between the first offer and the second offer based on the relationship between the first and second offered prices.

Particular embodiments of the present invention may provide one or more technical advantages. For example, particular embodiments of the present invention may provide a substantially fair market that includes a consortium of larger-capacity

buyers (or sellers) on one side of the market and a multitude of smaller-capacity sellers (or buyers) on the other side of the market. In particular embodiments, the bids (or asks) on the less populous side of the market may be sealed (meaning substantially not visible or otherwise inaccessible to at least a subset of all market participants), while the asks (or bids) on the more populous side of the market may be open (meaning substantially visible or otherwise accessible to at least a subset of all market participants). In particular embodiments, an open offer to buy or sell may be cancelled or otherwise removed from the market without any reason being given to market participants for the removal, which may make it more difficult for market participants to surmise particular market prices. In particular embodiments, the strike price (meaning the price at which a transaction has actually taken place) between a crossed bid and ask (meaning that the corresponding bid price is greater than the corresponding ask price) may be the ask price plus a portion of the price difference between the ask price and the bid price, which may serve to penalize the corresponding buyer and seller for creating a crossed market and deter market participants on the open side of the market from submitting bids or asks that substantially lead other bids or asks on the open side of the market in an attempt to gain information about the closed side of the market not otherwise visible (or otherwise accessible) to market participants. Particular embodiments of the present invention may also combine one or more advantages of a "request for quote" (RFQ) market with one or more advantages of an auction or an exchange market.

Systems and methods incorporating one or more of these or other technical advantages may be well suited for modern electronic markets. Other technical advantages may be readily apparent to those skilled in the art from the figures, descriptions, and claims included herein.

BRIEF DESCRIPTION OF THE DRAWINGS

To provide a more complete understanding of the present invention and the features and advantages thereof, reference is made to the following description taken in conjunction with the accompanying drawings, in which:

5 FIGURE 1 illustrates an example system supporting one or more electronic markets;

FIGURE 2 illustrates a graphical and conceptual representation of an example market including bids and asks; and

10 FIGURE 3 illustrates an example method for providing dynamic pricing in an unbalanced market.

DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS

FIGURE 1 illustrates an example system 10 supporting one or more electronic markets. System 10 may include one or more buyers 12, one or more sellers 14, and at least one electronic marketplace 16 associated with a web site or other environment accessible to buyers 12 and sellers 14. In general, electronic marketplace 16 or an associated device may receive bids from buyers 12 and asks from sellers 14 and, when a strike occurs, initiate a transaction between the corresponding buyer 12 and seller 14. A bid may include an offer to buy a particular number of items (which may include raw materials, component parts, products, or other tangible or intangible things that may be the subject of a transaction between buyer 12 and seller 14) at a particular price, and an ask may include an offer to sell a particular number of items at a particular price. A strike between a particular bid and a particular ask may occur when the corresponding bid price is greater than or substantially equal to the corresponding ask price and may result in a transaction between the corresponding buyer 12 and seller 14.

Although buyers 12 and sellers 14 are described as separate entities, a buyer 12 in one transaction may be a seller 14 in another transaction, and vice versa. Moreover, reference to a "buyer" or a "seller" may include a person, a computer system, an enterprise, or any other buying or selling entity, as appropriate. For example, a buyer 12 may include a computer programmed to autonomously identify a need for an item, search for that item, and buy that item upon identifying a suitable seller. Although buying and selling are primarily described herein, the present invention contemplates any appropriate market transaction.

Buyers 12, sellers 14, and electronic marketplace 16 may be coupled to each other using links 18 that may each include one or more local area networks (LANs), metropolitan area networks (MANs), wide area networks (WANs), a portion of the Internet, or any other appropriate wireline, optical, wireless, or other links. The components of electronic marketplace 16 may operate on one or more computers at one or more locations, and electronic marketplace 16 may share one or more

computers or other resources with one or more buyers 12 or one or more sellers 14, according to particular needs. Bids and asks may be received by electronic marketplace 16 or an associated device in any suitable format, such as in the form of Hypertext Markup Language (HTML), Extensible Markup Language (XML), or other suitable files within Hypertext Transport Protocol messages.

Associated with electronic marketplace 16, at one or more locations integral to or separate from electronic marketplace 16, may be one or more market servers 20 and one or more databases containing transaction information 22. In general, market server 20 may support a particular electronic market for a particular item or set of items. For example, market server 20 may receive bids from buyers 12 and asks from sellers 14, prioritize bids and asks, determine when a strike occurs between a particular bid and ask, determine a strike price, cancel a bid or ask automatically or at the request of the corresponding buyer 12 or seller 14 or otherwise remove a bid or ask from the market, keep a record of a particular strike by storing associated transaction information 22, initiate a transaction between buyer 12 and seller 14 when a strike occurs, and perform other suitable tasks associated with supporting an electronic market. Transaction information 22 may include a number of records, each corresponding to a particular strike. A record of a strike may reflect a strike price, a date and time, information identifying buyer 12 and seller 14, and a strike quantity. Transaction information 22 may be used by buyer 12, seller 14, and other appropriate entities to finalize a transaction between buyer 12 and seller 14 initiated as the result of a strike and for other suitable purposes.

FIGURE 2 illustrates a graphical and conceptual representation of example market 24 including bids 26 (which may include offers to buy) and asks 28 (which may include offers to sell). Market 24 may be supported by market server 20 and other devices associated with electronic marketplace 16 and may provide a forum for transactions between buyers 12 and sellers 14 involving a particular class of items. Market 24 may include a bid side 30, an ask side 32, and one or more vectors, such as per-item price vector 34 and priority vectors 36, each associated with different aspects

of bids 26 and asks 28 within market 24. In one embodiment, market 24 may combine one or more features of a "request for quote" (RFQ) or other suitable market with one or more features of an auction, exchange, or other suitable market.

Bid side 30 may include one or more bids 26, each including a bid price (meaning the price at which buyer 12 is offering to buy) and a bid quantity (meaning the quantity buyer 12 is offering to buy). For example, bid 26a may include a bid price of approximately \$5.20 (which may be graphically represented by the placement of bid 26a along price vector 34 at approximately \$5.20) and a particular bid quantity (which may be graphically represented by the length (as shown), color, shape, or any other suitable aspect of the graphical representation of bid 26a). As described above, bid side 30 may be sealed such that certain information pertaining to bid side 30 is substantially not visible to at least some of the market participants. Nonetheless, bid side 30 may be graphically represented as described herein to some of the market participants or others according to particular needs. Two or more bids 26 at substantially similar bid prices may be prioritized according to any suitable scheme, which may determine the order in which such bids are matched with one or more asks 28. In one embodiment, later-received bids 26 may be given lower priority than earlier-received bids 26 at the same bid price, and higher-priority bids 26 may be matched with one or more asks 28 before lower-priority bids 26. For example, bids 26b and 26c both include a bid price of approximately \$3.80, but bid 26b was received before bid 26c. Therefore, bid 26b may be given higher priority than bid 26c, as indicated by the relative placements of bids 26b and 26c along priority vector 36a, and bid 26b may be matched with one or asks 28 before bid 26b.

Ask side 32 may include one or more asks 28, each including an ask price (meaning the price at which seller 14 is offering to sell) and an ask quantity (meaning the quantity seller 14 is offering to sell). Ask prices may be graphically represented by the placement of asks 28 along price vector 34, whereas ask quantities associated with asks 28 may be excluded from a graphical representation of example market 24. Excluding ask quantities from a graphical representation of example market 24 may,

together with other features of example market 24, make it more difficult for buyers 12 and sellers 14 to surmise strike prices, market activity on bid side 30, or other aspects of example market 24 that may be desirable to keep hidden from buyers 12 and sellers 14, as described more fully below.

5 In example market 24, there may be fewer buyers 12 than sellers 14, and buyers 12 may individually have buying capacities much greater than the individual selling capacities of sellers 14. In keeping with this relationship between buyers 12 and sellers 14 in example market 24, bid side 30 may include a relatively small number of bids 26 from a relatively of small number of buyers 12, and the bid
10 quantities associated with bids 26 may be substantially larger than the ask quantities associated with asks 28. In contrast, ask side 32 may include a relatively large number of asks 28 from a relatively large number of sellers 14, and the ask quantities associated with asks 28 may be substantially smaller than the bid quantities associated with bids 26. As a result of these (and possibly other) differences between the supply
15 and demand sides of example market 24, buyers 12 may have substantial control over market prices within market 24, which may result in a market that is not substantially fair. Although a particular example market 24 is described herein, in which buyers 12 have disproportionate control over market prices, the present invention contemplates market participants on either side of market 24 having disproportionate control over
20 market prices for any suitable reasons.

To reduce the disproportionate control that buyers 12 may have over market prices in market 24, bid side 30 may be "sealed" such that bid side 30 is substantially not visible (as described above, information that is not visible may be otherwise inaccessible) to at least a subset of buyers 12 and sellers 14, while ask side 32 may be
25 left open such that ask side 32 is at least partially visible (as described above, information that is visible may be otherwise accessible) to at least a subset of buyers 12 and sellers 14. For example, bid side 30 may be sealed such that no buyers 12 or sellers 14 may view bids 26 or the corresponding bid prices and quantities, and ask side 32 may be open such that buyers 12 and sellers 14 may view ask prices

associated with individual asks 28. While ask side 32 may be open to buyers 12 and sellers 14, not all information associated with asks 28 may be made visible to buyers 12 and sellers 14. For example, as described above, ask quantities associated with asks 28 may not be visible to buyers 12 or sellers 14. Moreover, when a particular ask 28 is removed from ask side 32, no indication may be given to buyers 12 or sellers 14 whether ask 28 was removed due to the cancellation of ask 28 or due to a strike between ask 28 and a particular bid 28. Accordingly, certain information reflecting market conditions for market 24 may be withheld from buyers 12 and sellers 14 to create a market that is substantially fairer than it might be otherwise. For example, withholding such information may make it more difficult for market participants to surmise particular market prices. Although particular examples of information being withheld from buyers 12 and sellers 14 have been described, the present invention contemplates any suitable information pertaining to example market 24 being withheld from any suitable market participants. Embodiments of the present invention may, in this way, provide a substantially fair market that includes a consortium of larger-capacity buyers (or sellers) on one side of the market and a multitude of smaller-capacity sellers (or buyers) on the other side of the market.

A strike may occur between a particular bid 26 and ask 28 when the bid price associated with bid 26 is substantially equal to the ask price associated with ask 28. A strike between bid 26 and ask 28 may involve matching bid 26 with ask 28, initiating a transaction between the corresponding buyer 12 and seller 14, and removing all or a portion of bid 26 and ask 28 from example market 24. For example, bid 26a may include a bid price of approximately \$5.20 and a bid quantity of two hundred items, and ask 28b may include an ask price of \$5.20 and an ask quantity of twenty items. The bid price associated with bid 26a is approximately equal to the ask price associated with ask 28b, and a strike may therefore occur between bid 26a and ask 28b. When a strike between bid 26a and ask 28b occurs, a transaction involving the sale of twenty items at a price of \$5.20 per item may be initiated between the corresponding buyer 12 and seller 14, transaction information 22 pertaining to the

strike (such as the date and time of the strike, the identity of buyer 12 and seller 14, the strike price, and the strike quantity) may be recorded, bid 26a may be reduced in quantity by twenty items, and ask 28b may be removed from market 24. As described above, bid side 30 may be sealed, and the reduction in quantity of bid 26a (similar to
5 the original quantity of bid 26a) may not be made visible to buyer 12 and sellers 14. Additionally, buyers 12 and sellers 14 may be given no indication whether ask 28b was removed due to the occurrence of a strike or due to the cancellation of ask 28b.

A strike may also occur between a particular bid 26 and ask 28 when the bid price associated with bid 26 is substantially greater than the ask price associated with
10 ask 28, and the corresponding strike price between such a "crossed" bid 26 and ask 28 may be the ask price associated with ask 28 plus a portion of the price difference between bid 26 and ask 28. In one embodiment, the strike price between a crossed bid 26 and ask 28 may be a fraction, such as one-half, of the price difference between bid 26 and ask 28. For example, bid 26a may include a bid price of approximately
15 \$5.20 and a bid quantity of two hundred items, as described above, and ask 28a may include an ask price of \$3.20 and an ask quantity of five items. The bid price associated with bid 26a is substantially greater than the ask price associated with ask 28a, and a strike may therefore occur between bid 26a and ask 28a. When a strike between bid 26a and ask 28a occurs, a transaction involving the sale of twenty items
20 at a price of \$4.20 (which represents \$3.20 plus one-half of the difference between the bid and ask prices associated with bid 26a and ask 28a, respectively) per item may be initiated between the corresponding buyer 12 and seller 14, transaction information 22 pertaining to the strike may be recorded, bid 26a may be reduced in quantity by five items, and ask 28b may be removed from market 24. By setting the strike price for a
25 strike associated with a crossed bid 26 and ask 28 somewhere between the corresponding bid and ask prices, buyers 12 and sellers 14 may be penalized for creating a crossed market, and sellers 14 may be deterred from submitting asks that substantially lead other asks in an attempt to gain information about bid side 30 of market 24 not otherwise visible to buyers 12 or sellers 14. Although a particular

technique for handling crossed markets has been described, the present invention contemplates the use of any suitable crossed market-handling techniques.

When there are multiple bids 26 that include bid prices substantially equal to or greater than one or more ask prices associated with one or more asks 28, market server 20 may match such bids 26 with such asks 28 in a suitable order. In one embodiment, market server may match the highest-priority leading bid 26 with the highest-priority leading ask 28 before matching any other bids 26 and asks 28, and so on. A particular bid 26 may be successively matched with multiple asks 28 until the entire bid quantity associated with bid 26 has been depleted, and vice versa. For example, a bid 26 including an original bid quantity of one hundred items may be successively matched with asks including ask quantities of twenty, forty, ten, twenty-five, and five items, respectively, before being removed from market 24.

FIGURE 3 illustrates an example method for providing dynamic pricing in an unbalanced market. The method begins at step 100, where a seller 14 submits to market server 20 an ask 28 specifying an ask price and an ask quantity. Market server 20 receives the submitted ask at step 102. Although market server 20 is particularly described as performing different tasks associated with providing dynamic pricing in an unbalanced market, the present invention contemplates any suitable combination of devices internally or externally associated with electronic marketplace 16 performing such tasks. At step 104, market server 20 determines whether other asks 28 at the specified ask price are already present in market 24. If other asks 28 at the specified ask price are present in market 24, market server 20, at step 106, prioritizes the received ask 28 behind the other asks 18 at the specified ask price. As described above, the priority given ask 28 may determine the order in which ask 28 is matched with a particular bid 26 relative to other asks 28 at the same ask price. At step 108, market server 20 determines whether there is a bid 26 on bid side 32 at or above the specified ask price.

If there is a bid 26 on bid side 32 at or above the specified ask price, market server 20 determines whether the bid price associated with bid 26 is substantially

equal to the specified ask price at step 110. If the bid price is substantially equal to the specified ask price, market server 20, at step 112, matches bid 26 with ask 28 and initiates a transaction between the corresponding buyer 12 and seller 14 wherein the per-item price is substantially equal to the bid and ask price. At step 114, market server 20 determines whether the entire specified ask quantity was depleted in the initiated transaction. If the entire specified ask quantity was depleted, market server 20 removes ask 28 from market 24 at step 116, and the method ends. As described above, ask 28 may be removed from market 24 without any indication being given that a strike occurred between bid 26 and ask 28. If the entire ask quantity was not depleted, market server 20, at step 118, reduces the ask quantity by the number of items depleted. As further described above, the ask quantity associated with a particular ask 28 may not be made visible to buyers 12 and sellers 14. Accordingly, the reduction in quantity of ask 28 may not be visible to buyers 12 and sellers 14.

Referring again to step 110, if the bid price is substantially above the specified ask price, market server 20 matches bid 26 with ask 28 and initiates a transaction between the corresponding buyer 12 and seller 14 wherein the per-item price is equal to the specified ask price plus one-half of the price difference between the specified ask and bid prices. Although a particular technique for determining a strike price between a crossed bid 26 and ask 28 has been described, the present invention contemplates any suitable technique for determining an appropriate strike price between a crossed bid 26 and ask 28.

Although the present invention has been described with several embodiments, divers changes, substitutions, variations, alterations, and modifications may be suggested to one skilled in the art, and it is intended that the invention may encompass all such changes, substitutions, variations, alterations, and modifications fall within the spirit and scope of the appended claims.